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Zero Retries is an independent newsletter promoting technological innovation that is occurring in Amateur Radio, and Amateur Radio as (literally) a license to experiment with and learn about radio technology. Radios are computers - with antennas! Now in its fourth year of publication, with ~~2500+~~ 2600+ subscribers.

About Zero Retries

Steve Stroh N8GNJ, Editor

Web version of this issue - https://www.zeroretries.org/p/zero-retries-0194

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In this issue:

- **Request To Send**
  - Paid Subscribers Update
  - 2600 Email Subscribers to Zero Retries!
  - Tina KD7WSF and I at HamSCI 2025
  - One of the Better Moments of HamSCI 2025 - Meetup with Steve Davidson K3FZT
- **Impressions of HamSCI 2025**
- **From FCC - IN RE: DELETE, DELETE, DELETE**
  - The ARRL Steps Up a Bit More Than Usual
  - The Zero Retries Perspective on Commenting to the FCC re: Amateur Radio In The 21st Century
  - Zero Retries Videoconferences
- **ZR > BEACON**
  - Web Based decoders for horus and wenet
  - Introducing rpi-image-gen: build highly customised Raspberry Pi software images
  - SDRBERRY - This User Interface Is Just GORGEOUS! AND IT USES SOAPY TOO!
  - Winlink Express, VarAC, and VARA Modem on a Raspberry Pi 5
- **Zero Retries Boilerplate**
- **Permission for Reuse of Zero Retries Content**
- **Footnotes for this Issue**
- **Comments for This Issue** (redirect to Comments page)

Request To Send

Commentary by Editor Steve Stroh N8GNJ

Paid Subscribers Update

My thanks to **John Kiernan KE2UN** for *renewing* as an **Annual Paid Subscriber** to Zero Retries this past week!

My thanks to **Prefers to Remain Anonymous 25** for *renewing* as an **Annual Paid Subscriber** to Zero Retries this past week!

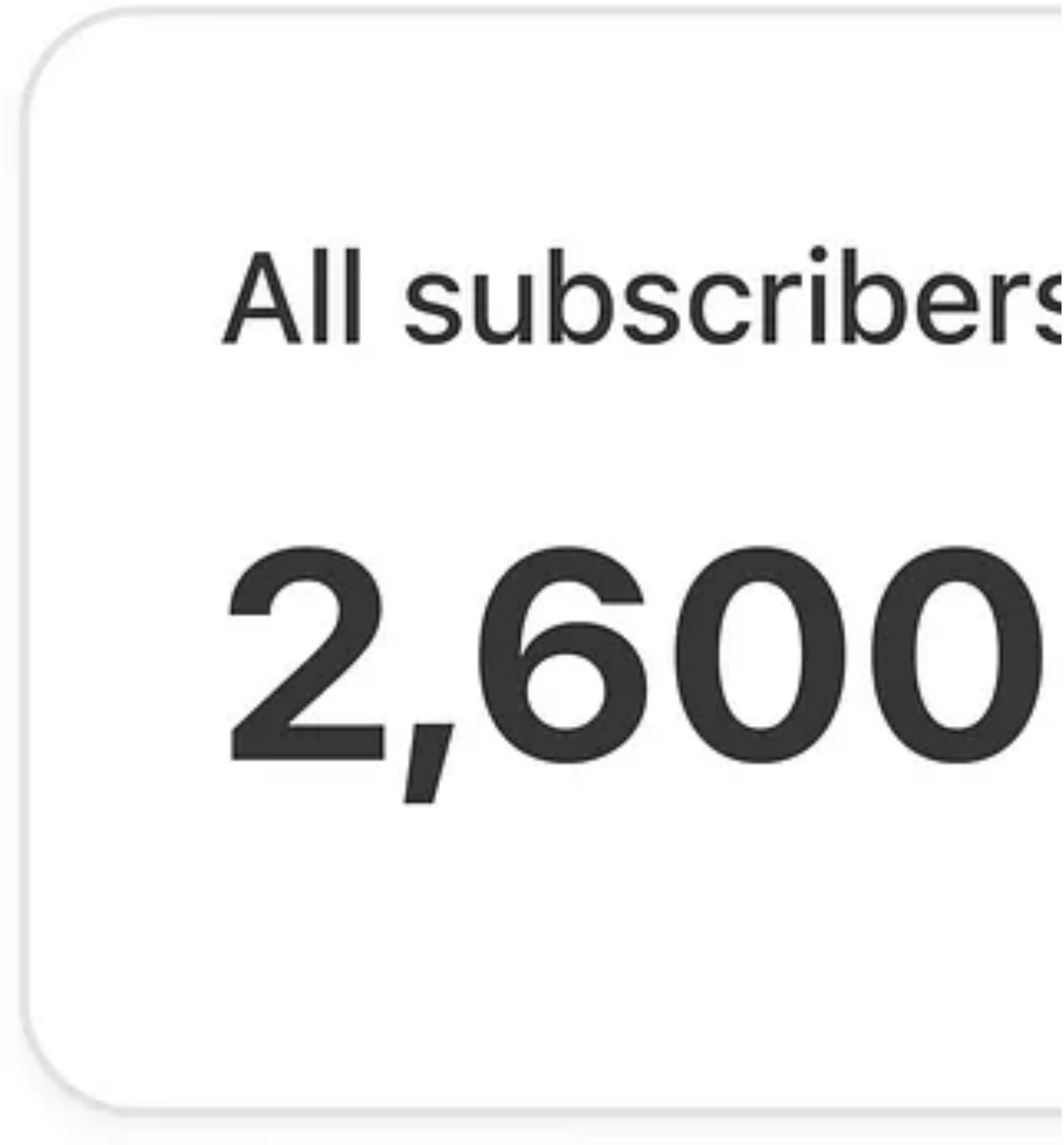
My thanks to **Prefers to Remain Anonymous 68** for *upgrading* from a free subscriber to Zero Retries to an **Annual Paid Subscriber** this past week!

My thanks to **Alex Free N7AGF** for *upgrading* from a free subscriber to Zero Retries to a **Paid Subscriber** this past week!

Financial support from Zero Retries readers is a significant vote of support for the continued publication of Zero Retries.

# # #

2600 Email Subscribers to Zero Retries!



I'm constantly amazed at the varied ways that new subscribers find their way to Zero Retries. In this case, the "big bump" of this tier seems to be a recommendation by Steve Herman on his The Newsguy newsletter on Substack. I was puzzled at first by this rush of subscribers (and Substack "followers") given that Herman doesn't write (that I've seen) about Amateur Radio. Some reading of his Substack newsletter revealed that in addition to his extensive journalism career, Herman is also W7VOA. Reading his About page revealed why his name was familiar - he was profiled in QST in the 2024-03 issue. Thank you W7VOA for the recommendation.

# # #

Tina KD7WSF and I at HamSCI 2025

Tina KD7WSF and I both attended HamSCI 2025 and we're both rocking our Zero Retries logo'd shirts. (Thanks Honey - you dress me up really well!)

HamSCI 2025 was especially memorable for Tina because her late father Peter Lewesky is a graduate of Newark College of Engineering Class of 1943, now named New Jersey Institute of Technology. Tina was able to visit the NJIT Alumni Office and found her Dad in the 1943 NCE Yearbook.

# # #

One of the Better Moments of HamSCI 2025 - Meetup with Steve Davidson K3FZT

I was honored that my friend, and Zero Retries Founding Member 0000 Steve Davidson K3FZT made the trek from Philadelphia to Newark and NJIT just to chat with me for a few hours

Photo courtesy of Tina Stroh KD7WSF

When I began the wild experiment of Zero Retries back in mid-2021, K3FZT was one of the first outside my immediate circle of acquaintances to substantively engage with me about the bigger picture of ZR… for which I am *profoundly* grateful to him.

# # #

Have a great weekend, all of you co-conspirators in Zero Retries Interesting Amateur Radio activities!

Steve N8GNJ

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Impressions of HamSCI 2025

By Steve Stroh N8GNJ

From About HamSCI - What is HamSCI's scientific focus?:

> *HamSCI was started by ham-scientists who study upper atmospheric and space physics. These scientists recognized that projects such as the Reverse Beacon Network, WSPRNet, PSKReporter, DX Cluster, ClubLog, and more are generating big data sets that could provide useful observations of the Earth's ionosphere and related systems. Because of this, HamSCI's initial focus is on these fields of research. In the future, other researchers may join HamSCI and broaden its scope. For scientists, working with the amateur radio community is a way to access individually managed stations, available by the hundreds in dozens of countries, with receive and transmit capabilities across the electromagnetic spectrum, easily identified in areas of interest and deployed to remote locations, for free. You can read more about the utility of amateur radio as a teaching tool in this Eos article.*

In this article, I won't attempt to describe all of the various presentations at HamSCI 2025. HamSCI 2025 was streamed live via Zoom, and videos of all the presentations will all be available on YouTube (and elsewhere?) in the near future after editing by Jason Johnston KC5HWB of Ham Radio 2.0 (who attended HamSCI 2025).

Prior to attending HamSCI 2025, I've been told that the HamSCI workshops were the closest thing - technical focus, good presentations, very interesting people… to the (formerly TAPR) Digital Communications Conferences, and that intrigued me. For HamSCI 2025, the logistics of the timing and the venue (New Jersey Institute of Technology - NJIT, in Newark, New Jersey, USA) worked out for my wife Tina KD7WSF and I. We attended both days.

It set a great "tone" for HamSCI 2025 that NJIT President Dr. Teik C. Lim opened the conference and spoke enthusiastically about how great it was that the HamSCI Workshop was being held at NJIT again and he asked when it was going to held at NJIT again. It was so cool to hear Lim's enthusiasm for what, in the end, is an Amateur Radio activity - that serves scientific inquiry and experimentation.

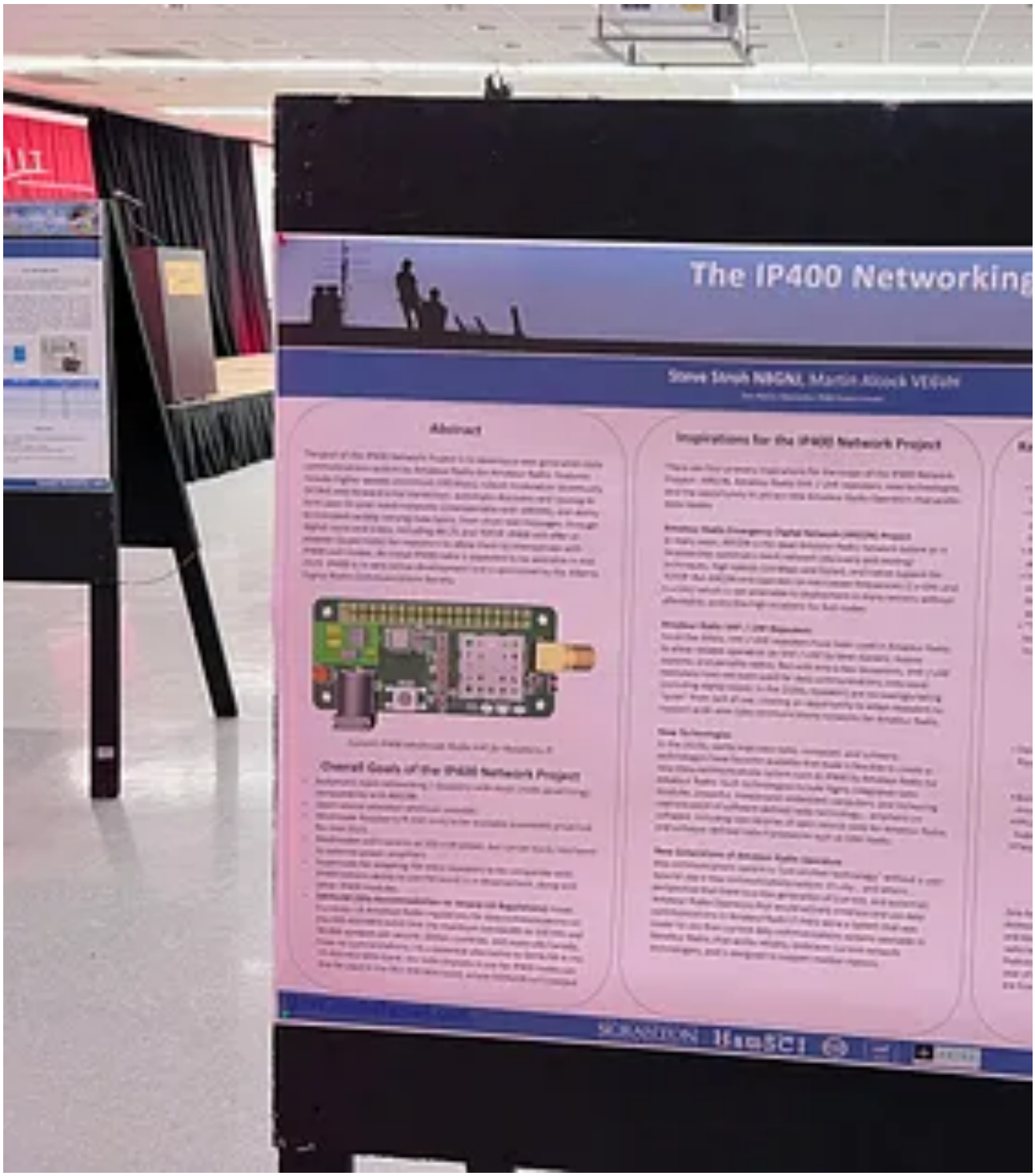
Another great tone was just attending in the presence of so many young people. There were plenty of us older folks, but we were in the minority, in the audience learning from the younger folks as they presented their topics. We older folks were largely learning from the younger folks presenting, and that gives me ample hope for the future of Amateur Radio.

Attending HamSCI 2025 was very stimulating. The presentations were excellent and despite not currently being a scientist or currently involved in any of HamSCI's research activities, I learned a lot and had a good time. The level of stimulation, the interesting people, and knowledge shared, and just the excitement about science, knowledge, radio technology, and just the very, very nice people made HamSCI 2025 an overall great experience for Tina and I.

High points for me:

- HamSCI 2025 (and, I gather, HamSCI in general) was one of the few Amateur Radio activities I've attended where folks under 30 were in the majority. Not to mention, very smart.
- I've seen a number of activities where Amateur Radio is "tacked on" - not really integral to the stated activity. That was not the case with the projects described at HamSCI 2025 - as the name HamSCI (Ham Radio Science Citizen Investigation) implies, Amateur Radio is *integral* to these activities.
- It was very cool to see the cross-collaboration between a number of universities such as University of Scranton, Case Western Reserve University and New Jersey Institute of Technology - all involving Amateur Radio. And all of those universities have new or updated collegiate Amateur Radio stations and clubs with active participation.
- It wasn't all scientific discussion - there was ample interesting focus on typical Amateur Radio activities such as a comparison of various HF antennas and a great primer on using developing Software Defined Radio apps with GNU Radio and GNU Radio Companion.
- It was cool to see that the sections of the presentations were organized by students giving them experience at running such a conference. In fact, it was great to see that the students were the primary organizers of the conference.

The Poster Sessions portion of the conference on Saturday afternoon was a great idea. Poster sessions have not been a feature of other conferences I've attended in the formal way that HamSCI 2025 did. In the few weeks prior to the conference, a notice went out that there were ten "poster" slots available, and I applied for one to discuss the IP400 Networking Project. The HamSCI 2025 staff made a PowerPoint template[1] available for a 3 foot by four foot poster, with good instructions, and I just filled in the blanks as specified. The conference printed the poster, and it turned out great[2].



HamSCI 2025 IP400 Network Project Poster - image by Steve Stroh N8GNJ

I appreciate that Bob Inderbitzen NQ1R interviewed me for a brief video by ARRL -

(My segment begins at 3:30).

I think I had five to eight people engage substantively about IP400, and asked substantive questions about data communications in Amateur Radio in general. The latter was the *real* goal - present something that represents Amateur Radio technology ***circa 2025*** to a crowd of curious, capable techies. My thanks to my co-conspirator on the IP400 Networking Project Martin Alcock VE6VH for overnighting a pair of prototype IP400 Meshnode printed circuit boards to show just how small, but amazingly capable, the radio chips have become and that most of the board is power conditioning and input / output. With that, I was able to hammer the point home that we're in a new era for Amateur Radio data communications.

A few other notable things about HamSCI 2025:

- ARRL had a presence at HamSCI to promote ARRL. It was great to see ARRL again attending a *technical* conference including a senior staff member - Director of Marketing and Innovation Bob Inderbitzen NQ1R, and ARRL Hudson Division Director Ed Wilson N2XDD.
  I engaged with NQ1R during the Poster Session, and he was complimentary about me "doing my thing with Zero Retries" but I didn't seem to make much headway with him that in this era of abundant free content, by paywalling all content that ARRL has ever produced, ARRL's enemy isn't copying, but *irrelevance*[3] because ARRL content is effectively invisible to all but the twenty percent (and falling) of US Amateur Radio Operators that choose to support ARRL financially by becoming a member.
  Another notable person hanging around the ARRL table at HamSCI 2025 was Rich Moseseon W2VU, former Editor of CQ Magazine (and my former Editor when I was writing for CQ). W2VU wrote the HamSCI article in this week's ARRL Letter - Ham Radio, Students and Scientists at the 2025 HamSCI Workshop.

- ARDC was represented by ARDC Directors Phil Karn KA9Q and Ria Jairam N2RJ. It's commendable that ARDC provided a substantial grant for the great event that HamSCI 2025 ended up being, and I applaud ARDC for doing so. Such "investments in the future" such as conferences like HamSCI Workshops, scholarships, and long term projects like Digital Library of Amateur Radio & Communications (DLARC) are the highest and best investments that ARDC can make.

- GNU Radio was represented by Samantha Palazzolo KM4SMP and Derek Kozel K0ZEL / MW0LNA (who did the Invited Tutorial on GNU Radio).

- Youth On The Air (YOTA) had a table at HamSCI 2025. I was able to chat with YOTA Camp Director Neil Rapp WB9VPG about easy and cheap Amateur Radio Data Communications modes using All In One Cable (AIOC) and DigiPi.

Because of a presentation that ran long, and being a Poster presenter, I didn't get to attend the tours of the NJIT Amateur Radio Club station K2MFF or the campus makerspace. That was a minor bummer.

The venue of HamSCI 2025 at New Jersey Institute of Technology was really great with plenty of good classroom seating, great audio / visual, snacks, lunch, and best of all, Seattle-strong coffee all day, both days.

One minor issue was that NJIT's guest Wi-Fi was very aggressive at disconnecting my laptop every time it went to sleep or I closed the lid, and it was irritating to constantly re-enter my guest user ID and password, without the ability to cache that as a cookie. NJIT could do a better job for us "guests" that were there for a specific conference of a defined duration, and to even get guest access, we had to fill out a brief form, so they had some reassurance that we were who we said we were.

When I attend future HamSCI conferences (and it seems certain that I / we will), I plan to bring some small "show and tell" systems for data communications such as IP400, AREDN, DigiPi with AIOC, Ribbit to be able to do more evangelism on a small table (like Youth On The Air did) amongst the talented HamSCI attendees for *relevant*, modern Amateur Radio data communications.

Another perspective of HamSCI 2025 from Mindy Hull KM1NDY

HamSCI Workshop 2025: A Little Bit Of Citizen Science-ing

> *This post contains: my "fake" journal article which is actually a rather nice write-up of the very real work I have done if I do say so myself, a printable copy of my poster, and the raw and processed data from this experiment. I am putting it all on here because of the interest that was expressed at the HamSCI Workshop on this simple little study.]*
>
> You may recall that waaayyyy back on April 8, 2024, I was inspired by HamSCI's Solar Eclipse QSO Party to get on the air. I tried making a

few phone contacts with SSB, but I really did not manage to get all that many. On the other hand, I let my WSPR transmitter cycle from 80M to 10M over and over again throughout the entire eclipse which did get several hundreds of spots. I got ahold of this data through WSPR Rocks! and spent a bit of time analyzing it. The long and short of it was that WSPR transmissions from my location in Upstate New York were received at longer distances at the maximum obscuration of the sun and beyond than they were before maximum obscuration on 30M (and somewhat less convincingly 20M). I thought the data was interesting and self-published a fake journal article with very real results for my own amusement.

KM1NDY was also profiled in the ARRL video. Her article captures the flavor of HamSCI 2025 very well in her wanting to contribute to the scientific discourse of the event and the overall *research* focus of HamSCI.

# # #

My Thanks To…

Lastly, in deciding to attend HamSCI 2025, I'm grateful for the encouragement of Ryan Tolboom N2DB, who is a longtime reader of Zero Retries. Gary Mikitin AF8A was amazingly responsive about my participation in the Poster Session. Gareth Perry KD2SAK published very useful and timely emails about the details of attending HamSCI 2025.

Leave a comment

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From FCC - IN RE: DELETE, DELETE, DELETE

By Steve Stroh N8GNJ

*For background, see **Zero Retries 0193** - Breaking News - From FCC - IN RE: DELETE, DELETE, DELETE.*

The FCC is formally requesting input …

> *Specifically, we are seeking public input on identifying FCC rules for the purpose of alleviating unnecessary regulatory burdens.*
>
> *We seek comment on deregulatory initiatives that would facilitate and encourage American firms' investment in modernizing their networks, developing infrastructure, and offering innovative and advanced capabilities.*

In saying "American firms' investment", it's obvious that Amateur Radio isn't the "target audience" of this FCC Public Notice / Request for Comments… but by far that does not mean that US Amateur Radio can afford to, or should, ignore this FCC action.

Not burying the lede in *this* article:

Comments Due: Friday, April 11, 2025

Reply Comments Due: Monday, April 28, 2025

In three weeks… twenty one days… responses from US Amateur Radio Operators… at least those of us who take this seriously and / or see it as a potential opportunity to modernize US Amateur Radio… are due to the FCC.

I think that Amateur Radio needs to (at a minimum) go on the defensive in "re-representing" Amateur Radio (in the 21st century) to the FCC, but perhaps (at least mildly) go on the offensive and in the spirit of the "alleviating unnecessary regulatory burdens" promote substantive changes in US Amateur Radio that will position it for vastly improved relevance in the 21st century to current and future generations of Amateur Radio Operators.

I had hoped that in the *eight days* since this was published that a "US Amateur Radio Coalition" of US-based Amateur Radio organizations *would have emerged*. As far as I'm aware (at least, no one reached out to me to let me know of one), no such coalition has formed, so I'm forced to assume there won't be one.

Thus I think it's up to those of us US Amateur Radio Operators (and those non-US Amateur Radio Operators that care to comment) with a "Zero Retries perspective", (interested in seeing Amateur Radio continue into the 21st century) to weigh in individually.

The ARRL Steps Up a Bit More Than Usual

In fairness, the ARRL is publicizing this issue and in a notable departure from its previous practice of formulating its responses internally, it has asked for input (from ARRL members).

The ARRL Letter for March 20, 2025:

> **FCC Initiates Broad Inquiry on Rules to Delete or Amend**
>
> In a Public Notice titled "In Re: Delete, Delete, Delete," issued on March 12, 2025, the FCC is soliciting public input on any FCC rules in any service that members of the public believe should be deleted or modified "for the purpose of alleviating unnecessary regulatory burdens." This is the latest in a series of similar proceedings going back to 1996, when the Communications Act was amended to require the FCC to periodically review its rules.
>
> ARRL, through its Executive Committee and FCC Counsel, is conducting a review of the provisions in Part 97 and other related rules that apply to radio amateurs. ARRL is also soliciting feedback from its members. Rules identified as outmoded, obsolete, or that for other reasons should be repealed or modified, will be included in ARRL's filing to be submitted no later than the FCC deadline of April 11, 2025. The deadline for filing reply comments is April 28, 2025.
>
> It is expected that the Commission will incorporate suggestions that it decides worthy of its consideration in a future Notice of Proposed

> Rulemaking (NPRM) that could be issued later this year. There will then be an opportunity for public comment on the specific rules that the Commission proposes for deletion or modification.
>
> A PDF of the FCC Public Notice is available here: https://docs.fcc.gov/public/attachments/DA-25-219A1.pdf.

ARRL Member Bulletin for March 21, 2025:

> March 21, 2025
>
> **ARRL to Gather Comments from Members on FCC's Public Notice**
>
> Dear ARRL Member,
>
> On March 12, 2025, the Federal Communications Commission (FCC) issued aPublic Notice titled "In Re: Delete, Delete, Delete," seeking input from the public on FCC rules that may be outdated, unnecessary, or in need of modification. This inquiry is part of the FCC's ongoing effort to alleviate regulatory burdens across various services, including the Amateur Radio Service.
>
> As part of this review, ARRL is conducting a thorough examination of the provisions in Part 97 and related rules that affect amateur radio operators. ARRL's written comments, which will be prepared by our FCC Counsel and the ARRLExecutive Committee, will include consideration of feedback we received from members.
>
> **Members who want to share comments and concerns about this matter are urged to share your feedback directly with ARRL. Please submit your comments by March 31, 2025 and use the following feedback form:**
>
> **www.arrl.org/fcc-public-notice-march-2025**
>
> ARRL will submit our official filing to the FCC by the April 11 deadline. After that, there will be an opportunity for reply comments at the FCC until April 28, and then later, opportunities for public comment on any rules the FCC proposes to delete or modify.
>
> While the FCC Public Notice is a broad inquiry that does not single out any specific radio service, ARRL is nonetheless committed to protecting the AmateurRadio Service, promoting its public interest goals, and ensuring your right to access radio spectrum.
>
> ARRL will continue to work on this matter, and we will inform members as more news develops.
>
> Thank you,
>
> 73
>
> ARRL Executive Committee

While these two bulletins are helpful… there are a number of things to note:

- Despite its branding that it is "The [US] National Association for Amateur Radio", this statement and request for input *went only to ARRL members*. This issue is broad, and affects much more than ARRL members and the general interests of ARRL members.
- *Best case*, these notices went out to the < 20% of US Amateur Radio Operators that are current ARRL members.
- While the ARRL Letter[4] does include a web version that can be shared and linked to, the Member Bulletin was *only distributed via email* (no web version). Not having a web version web version that can be referenced and shared more widely beyond those who receive the email (or read Zero Retries) is a significant drawback to publicizing this issue (and the ARRL's involvement) widely.
- At least in my case, clicking the link to provide input to the ARRL is only accessible to ARRL members after you've logged in to the ARRL website.
- Followup ("… we will inform members…") will be to *ARRL members*.

It's not a discussion (fight) for today, but the ARRL just seems out of sync with its *minority representation* of "ARRL members" (again, < 20% of US Amateur Radio Operators) rather than trying to truly be "The [US] National Association for Amateur Radio".

Despite those issues, I'll accept their offer to provide input. In addition to my individual response to the FCC, as soon as I've formulated my comments, I will provide those to the ARRL for consideration in forming its response to the FCC.

The Zero Retries Perspective on Commenting to the FCC re: Amateur Radio In The 21st Century

Because of the timing of this coinciding with travel to / from HamSCI 2025, I haven't had enough time for the research and consideration necessary to form a cogent response by the time this issue will publish (and, publish later than usual).

As I develop these (and additional) themes, I may publish some special issues of Zero Retries in the coming weeks.

Part 97 in a 3 by 5 Inch Card

This is the clearest "vision" of what US Amateur Radio regulations *ought to be* that I've ever heard:

My feeling of how Part 97 should read is easy — "Here's your band limits. Have a nice day." I think we could fit the whole of Part 97 on this side of this three by five card in large type. So that even a bifocal guy like me could read it without glasses.

Context of that quote:

> That "bifocal guy like me" statement was made by Lyle Johnson KK7P (then WA7GXD) in September 1996 at the ARRL and TAPR Digital Communications Conference in Seattle, Washington. Yup. 26 years ago.

See **Zero Retries 0035** - Special Temporary Authority (STA) and Part 5 Experimental Radio Service.

Even 29 years later now, I don't think the FCC is quite ready for that level of simplicity… but this is a moment when we might be able to make some progress to that laudable goal.

…

Following are some broad themes of what I plan to comment to the FCC:

Delete; don't add.

It's important to note that the FCC's specific request is "*What regulations can we **delete**?*" It's my perception that the FCC will not be receptive to any *additional* regulations (that will require much more work to "vet" as to whether additional regulations will be advantageous). In comparison, removing regulations is comparatively simple (and in keeping with the scope of the FCC's Public Notice / Request for Comments).

Streamline to a Single License Class?

I'm personally not equipped to, and thus probably won't try (at least in this proceeding), to make the argument that US Amateur Radio licenses should be streamlined to a single class of license as is done in other countries.

But as I was explaining in text about what changes I think should be made (now deleted the more I considered the idea)… it struck me that the goal is to grow Amateur Radio to allow more experimenters and experimentation.

So, perhaps there *is* a case to be made for collapsing the US Technician, General, and Extra classes into a single license class - General, with *all* spectrum privileges. Amateur Radio, not the FCC, is in charge of the examination question pool, so in preparation for such a change, the question pool could be updated to reflect this change - a bit more regulation knowledge about HF, a bit more about RF safety, and a bit more about data.

Other countries use increasingly rigorous examinations as qualifications for using maximum power, or being station or repeater trustees, or building one's own radios. In the US, we've granted all of those capabilities to the entry level Technician license, thus "restricting" such capabilities would be regressive.

Primary Justification 1 - Amateur Radio is Communications of Last Resort

From the FCC's perspective[5], Amateur Radio being able to offer "Communications of Last Resort" is an important justification for continuing Amateur Radio. Thus we should identify regulations that impact that role and capability. We should emphasize the *data* capability of Amateur Radio as "Communications of Last Resort" such as email (Winlink), independent VHF / UHF / microwave networks (IP400, Packet Radio, AREDN).

Primary Justification 2 - The "Spectrum Workforce" Challenge

The US government is now painfully aware of the severe shortage of qualified personnel that understand radio technology intimately. The technologies that are now modern requirements of life - mobile phones, Wi-Fi, navigation with satellite positioning, even things as mundane as embedded medical devices are all being developed largely outside the US. About the only things in radio technology that the US really dominates is US military communications and perhaps (for now) Low Earth Orbit (LEO) broadband Internet access.

Experience with Amateur Radio can really "kickstart" one's career in radio technology with hands-on, empirical experience with actual radio technology and communications. With that background, it's much easier to "get up to speed" in engineering, designing radio networks, deploying infrastructure, etc.

This is in contrast to "black box wireless" technology such as Wi-Fi, Bluetooth, LoRa, Near Field Communications, and other "appliance" radio technologies (that admittedly are *designed* to be used as plug and play solutions without *needing* to understand how they work).

I've previously written about the Spectrum workforce issue in Zero Retries, and will incorporate some of that verbiage in my FCC comments.

Primary Justification 3 - Experimentation In HF / VHF / UHF

In the 2020s and beyond, the microwave bands above 1 GHz are the "money bands", and thus HF, VHF, and UHF bands are being neglected for development - except in Amateur Radio.

One of the most remarkable achievements that was developed solely by Amateur Radio is Weak Signal Propagation Mode - WSPR. WSPR made practical basic data communications via HF at ranges (literally worldwide) and low power levels that were previously thought impossible. Most notably, WSPR was implemented inexpensively. A basic WSPR transmit, or receive, station can be implemented for under $50.

Another singular achievement done solely in Amateur Radio is improvement in reliable voice communications on HF using FreeDV. Like WSPR, FreeDV can be implemented inexpensively, and in some (Software Defined) radios, implemented in the radio as "just another mode".

To cite one last example, as part of the M17 Project, cryptographic transmission signing has been tested. Without encryption, or proscriptive controls, individual transmissions can be verified (tested) against known (public key) cryptographic signatures. If implemented, "jamming" a repeater system would be all but impossible.

All of those developments wouldn't be feasible to develop and test anywhere other than Amateur Radio.

Easier Experimentation by Amateur Radio in Amateur Radio

There's a distinction at the moment between Amateur Radio operation in Amateur Radio spectrum, and Experimental modes that are licensed via a FCC 5 Experimental license. That shouldn't be the case. If an Amateur Radio Operator (or group) wants to experiment with something really radical in Amateur Radio spectrum, there should be a simple procedure to do so such as posting a notice (that can reasonably be expected to be noticed, not buried in some footnote of a newsletter or web page) in advance about what the experiment will be, who will be participating (and where geographically and spectrally), and who to contact if there's a noticeable issue.

Another example of experimentation that should be encouraged instead of excessively regulated is the restrictions on Spread Spectrum in Amateur Radio spectrum. Any such restrictions should just be removed, perhaps with restricting Spread Spectrum to Amateur Radio bands above 50 MHz[6].

Encryption

One of the thorniest issues in Amateur Radio in the 21st century is encryption. In the regulations, that's somewhat addressed in the Part 97 rules as "don't deliberately obfuscate to hide the meaning of a transmission". But encryption has become a staple of modern life - in messaging, in viewing web pages, and especially when Amateur Radio, in the role of "Communications of Last Resort" is asked / required to not transmit sensitive information in the open.

The problem is that if we don't have the ability to do encryption (near blanket prohibition), we don't have any ability to "practice" doing encryption *when the need arises*. We can't flip a switch to flip to start transmitting encrypted data.

I don't know how we ask for at least minimal encryption capabilities *when the need arises* in Part 97. Crafting such tricky legalese is one of the reasons I hoped that I had hoped for a broad coalition of Amateur Radio would come together, with at least some of the representatives having a modern stance towards the necessity of encryption.

I've previously written about Canada's approach to encryption via key escrow. Despite its drawbacks (it's not fully secure… by design; Amateur Radio isn't intended to be a secure system / network).

Data, Data, Data

Data communications is the norm in the 2020s and beyond. In general society, we just don't do analog communications any more. We don't need to, and we don't want to because data communications allows cheaper, more reliable, and more capacity.

The current generation prefers texting to speaking. Even "speaking" has (arguably) become a data mode in the use of digital voice; whose transmissions are a data stream with a specific format. I think it's just a matter of (short) time before digital voice becomes more common than analog voice modes. I think we're probably there in VHF / UHF repeater voice usage, with DMR, D-Star, and System Fusion, and I think FreeDV would quickly become *very* popular on HF if manufacturers of Amateur Radio HF radios included FreeDV as a standard mode, as (admirably) HF Signals has done with their new zBitx HF radio.

Thus we need to re-orient US Amateur Radio to be, if not data-first, at least data-equal. Amateur Radio regulations that impede the development of better, more sophisticated, and more experimental data communications need to be removed.

Software Defined Radio is now "Just Radio"

In this era, in Amateur Radio, we now make a false distinction between "radio" and "S*oftware Defined* Radio". That's because Amateur Radio is one of the last (besides broadcast radio) uses of analog radio technology. But even in Amateur Radio, a radio is increasingly "mostly software", and thus Software Defined Radio.

Thus we in Amateur Radio need to evolve our mindset that "writing a new radio" is the way radios are developed and manufactured in the 2020s and beyond, even if those radios provide legacy modes such as SSB and FM.

Thus Amateur Radio regulations need to recognize that to fulfill the role of Amateur Radio as an experimental radio service, the recognition of Software Defined Radio technologies need to be embedded, with the simple measure of a formal description of an new or experimental radio technology used in Amateur Radio spectrum just needs to be made public by posting on a website that's accessible to everyone.

Continued, Easier Experimentation in the Amateur Radio HF Bands

Despite what some suggest, as demonstrated by groups such as HamSCI, high frequency (HF) (aka "Shortwave") bands are increasingly critical for US competitiveness and military defense. HF is useful not just for "no infrastructure" worldwide communications, but for other uses such as Over The Horizon RADAR (cite Australian system).

One really interesting recent development in HF is reliable regional HF communications using Near Vertical Incidence Skywave (NVIS) techniques and antenna systems.

Pecuniary Interest - Simply Amateur Radio Isn't To Be Used For Routine Business

This is one of the most painful, divisive issues in Amateur Radio - what is the definition of the arcane term "pecuniary interest"?

We should be able to come up with simple language of what is, and what isn't allowed in Amateur Radio. Taxicab dispatch? No. Casual chat about this weekend's location for the Saturday brunch meetup? Yes.

For example, I'm reluctant (and admittedly perhaps overly cautious) to interact with other Amateur Radio Operators on a "talk group" about Zero Retries for fear that I'll be accused of "pecuniary interest" because I accept paid subscriptions to Zero Retries.

VHF / UHF Repeaters - No More Reserved Frequencies

"Coordinated" frequencies for Amateur Radio VHF / UHF repeaters is one of the most sacred concepts in modern Amateur Radio… and the most anachronistic. It's a longer discussion than space and time permits here, but in my comments I'll be proposing that the FCC remove all verbiage that it be an arbiter of what repeater system has priority. What system / group / individual has priority for the sacred repeater pair for 146.76 MHz in a given area is something that those in that area should sort out… not the FCC. In the 2020s and beyond, we have the technology to sort out such issues, and to the plaint that "Our repeater is too old for such things"… well, that's technological evolution in action.

Zero Retries Videoconferences

On behalf of Zero Retries, I intend to convene a series of Zoom videoconferences to discuss these and other ideas on how to provide effective comments to the FCC. ***Details are very much To Be Determined***. I'll guess that these videoconferences will be quickly oversubscribed, so the usual "free for all" format of a typical Zoom videoconference won't work. Thus these videoconferences will be "conference format" - listen / view only, with comments, with speaking slots pre-arranged.

To answer an obvious question / observation… no, I really don't know what I'm doing in proposing this. But I haven't seen mention of anyone else, or any group, doing such a thing, and in true Zero Retries "Irrational Exuberance" fashion… if I want to see such a thing happen, and no one else is doing it, I

might as well give it a try. It seems to have worked out for Zero Retries as a newsletter.

If a Zero Retries reader would like to get some presentation time, contact me privately. And yes, priority will be given to those who are on record as Zero Retries email subscribers as of this date of publication.

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ZR > BEACON

By Steve Stroh N8GNJ

Short mentions of Zero Retries Interesting items.

Web Based decoders for horus and wenet

Comment in **Zero Retries 0192** by Michaela:

> We've recently made web based decoders for horus (4fsk 100 baud) and wenet (2fsk 115117 baud) over at https://horus.sondehub.org. [wenet - https://github.com/projecthorus/wenet] This might be related to your interests as it shows that you can lower the entry requirements to playing with digital data on amateur radio. Even works on mobile phones.
>
> Wenet is a radio modem designed to downlink imagery from High-Altitude Balloon launches. It uses Frequency-Shift-Keying (FSK) at a rate of ~115kbit/s, and uses LDPC forward-error-correction to provide 6 dB of coding gain.
>
> The transmit side is designed to run on a Raspberry Pi, and the UART is used to modulate a HopeRF RFM98W in direct-asynchronous FSK mode. We usually operate in the quieter 440-450 MHz portion of the amateur 70cm band, with our nominal frequency being 443.5 MHz. Due to the non-ideal filtering in the transmitter module the occupied bandwidth is ~300 kHz, so Wenet is not suitable for operation in the 434 MHz ISM band. The usual transmit power we use is 50mW, into an inverted 1/4-wave monopole underneath the payload. Details on the modulation and packet formats are available here.
>
> The receiver side makes used of Software Defined Radio (in particular, RTLSDR dongles), and a high performance FSK modem written by David Rowe. Received images are available locally via a web interface, and are also uploaded to https://ssdv.habhub.org/ where packets contributed by many stations can be used to form a complete image live during a flight.

This is very cool.

# # #

Introducing rpi-image-gen: build highly customised Raspberry Pi software images

Matt Lear on the Raspberry Pi website (blog):

> When it comes to software on Raspberry Pi devices, one size doesn't always fit all. Raspberry Pi OS is ideal for many applications, but we recognise that it doesn't suit every use case or deployment model, particularly in a product that has a specific purpose. If you're building an embedded system or an industrial controller, you'll need complete control over the software resident on the device, and home users may wish to build their own OS and have it pre-configured exactly the way they want. For developers and organisations that require a custom software image, a flexible and transparent build system is essential; to support these customers, we have created rpi-image-gen, a powerful new tool designed to put you in complete control of your Raspberry Pi images.

Distributing an "image" rather than "software / app" is a powerful concept that's been used for some time in Amateur Radio to mitigate some of the complexities, and pitfalls of using Linux. The advantage of Raspberry Pi offering this is a standardized way to distribute images.

I can imagine this being very, very useful for Amateur Radio "appliances" based on Raspberry Pi computers. Two examples that come readily to mind are DigiPi and zBitx. Not to mention KM4ACK's packaging of Linux, WINE, and VARA (see below).

# # #

SDRBERRY - This User Interface Is Just GORGEOUS! AND IT USES SOAPY TOO!

Yet another great video and review from Matthew Miller M0DQW on his Tech Minds YouTube channel. This video showcases just how powerful and usable the combination of a dedicated Raspberry Pi and a semi-commodity Software Defined Receiver… *and great **software**…* can be.

# # #

Winlink Express, VarAC, and VARA Modem on a Raspberry Pi 5

Karl-Heinz Krawczyk DL1GKK on his blog:

> I am a big fan of Raspberry Pi computers, especially for amateur radio. With minimal effort and low cost, all digital modes can be utilized. However, a common challenge has been that not all programs are available for Linux. Additionally, Windows emulation with Wine was often too slow on older Raspberry Pi models to be truly practical.
>
> That has changed with the Raspberry Pi 5. Thanks to its significantly improved performance, Wine now runs surprisingly smoothly, allowing many Windows programs to function without issues.
>
> Installation is incredibly simple using the excellent 73Linux script by KM4ACK. 73Linux is the successor to the well-known "Build a Pi" script and can be downloaded here: https://github.com/km4ack/73Linux.
>
> To install Wine, I simply select the VARA option in the installation script. This automatically sets up the PiApps Store, which allows me to install VARA HF along with the complete Wine environment. After that, I remove VARA HF from PiApps and install Winlink Express, VarAC, VARA HF, and VARA FM directly within the Wine environment. These programs then appear conveniently in the Raspberry Pi menu.

Prior to this seminal development, I had been resigned to use VARA FM and VarAC on Windows because I lack the "Linux-fu" skills to get Linux and WINE performing well enough to be able to focus on using VARA FM and VarAC.

That said, I've been expecting / waiting / hoping for this exact development… and it's now here. All the pieces have been available - Linux, WINE, VARA and thus it was a (very fiddly) job to create a script to get it all installed and working together, known to work, especially all the obscure hooks that VARA needs from WINE rather than Windows.

Kudos to Jason Oleham KM4ACK for pulling this together.

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These bits were handcrafted (by a mere human, not an Artificial Intelligence bot) in beautiful Bellingham (The City of Subdued Excitement), Washington, USA, and linked to the Internet via **Starlink *Satellite* Internet Access**.

See the **Zero Retries Boilerplate** page for significant acknowledgements and other information relevant to Zero Retries. For new readers of Zero Retries, that page, and the **About Zero Retries** page has useful information to check out.

My ongoing ***Thanks*** to:
Tina Stroh KD7WSF for, well, *everything!*

Jack Stroh, Late Night Assistant Editor Emeritus
Shreky Stroh, Late Night Assistant Editor In training

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This issue released on 2025-03-21

Footnotes for this Issue

To see the relevant sentence for the footnote, just click the footnote number.

1

I've given up on Microsoft's whims for its Office suite and annual subscription and I've converted my "office" activities over to Apple's "office" apps, in this case Apple Keynote, which worked fine with the PowerPoint template. Kudos Apple!

2

The pink tinge is a photo artifact - the poster was white background.

3

The reflexive position of ARRL on anything that's ever appeared with an ARRL copyright notice is *Gasp! Sputter! But… but… it's* ***our*** *copyrighted material*. **Yep.** How's that working out for you ARRL as your organization spirals into irrelevance from its material being all but invisible to the eighty-plus percent (and growing) of US Amateur Radio… and all Amateur Radio Operators in the rest of the world… who don't (and never will) know of the existence of ARRL as an organization and its material? ARRL's is a 20th century mindset about the primacy of printed publications in the electronic media universe of the 21st century. By keeping old publications like the Gateway newsletter out of archives like DLARC, ARRL is winning the battle (of the moment), but losing the war of relevance in the 21st century.

4

When I did a web search for **ARRL Letter**, the first link was to this page - http://www.arrl.org/arrlletter and the most recent version of the ARRL Letter on that page is from 2024-05-09.

5

For *this* discussion, putting aside the "inside baseball" issues I've previously discussed with Amateur Radio emergency communications in the era of Starlink, Iridium, FirstNET, etc.

If we do get the prohibitions against Spread Spectrum removed, it will be a debt paid to two mentors of mine, both of whom are now Silent Keyboards - Greg Jones WD5IVD and Dewayne Hendricks WA8DZP. Both worked very hard to get modern Spread Spectrum enabled in Amateur Radio, and that hard work was almost completely stymied. We have it now - LoRa, but very few recognize (or care) that LoRa is merely a proprietary implementation of Chirp ***Spread Spectrum***.